William Chargin

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Experience

Army High Performance Computing Research Center **Stanford University**
Student Researcher *June–August 2014*

- Worked and studied at the AHPCRC Summer Institute for eight weeks.
- First pre-undergraduate student ever admitted to the program.
- Developed real-time physics simulations on low-powered portable devices.
- Designed a novel algorithm for distribution of points on a 3D triangulated mesh, following a provided UV density function.
- Received verbal commendation on excellence of research report.

Model United Nations (League of Creative Minds) **Burlingame, CA**
Head Delegate; Undersecretary-General of Technology and Innovation *2011–2014*

- Managed all levels of technology (mainly AV, networking, communications) for about a dozen conferences over three years.
- Developed a novel debate management system, facilitating timing, voting, speech analysis, and more.
- Delivered technical and scientific briefings to students.
- Received the Model Diplomat award for my contributions in technology.

Projects

Real-time portable physics

While working at AHPCRC, I developed real-time physics simulations on low-powered Android tablets. My work included articulated rigid body, cloth, smoke, and dynamic paint simulations. I also implemented such rendering features as UV mapped textures and fog. To accomplish real-time, physically accurate simulations, I borrowed some techniques from mainstream game design, such as partial pre-baking and interpolation, to maintain physical realism while not dramatically hurting the simulation speed. Finally, I designed a system for efficient simulation of arbitrarily complex urban environments.

Advanced computer science curriculum

During my senior year of high school, I pursued advanced, college-level computer science coursework in an independent study designed by a full-time Microsoft Software Engineer. I completed modules including: algorithms and data structures (searching and sorting, trees, disjoint sets, graphs, hash tables, and more); concurrency (threading, synchronization, semaphores, mutexes); dynamic programming; bit operations; image edge detection; and more. I use a repository at `github.com/WChargin/apcs` for my projects. Executable jarfiles for some projects (maze generator, edge detection, word ladder,

graphs GUI, and more) are available on the GitHub Releases page.

Model United Nations moderation system

Technology problems often plague Model UN conferences. To address this, I created and deployed an application system that unifies the tools that chairs need to aptly moderate debates. My system has been used at multiple conferences, by dozens of chairs and hundreds of delegates. Since its initial release, I have accepted and incorporated many suggestions, from simple UI tweaks to integration with software suites such as Google Docs. It is open source and available at `wchargin.github.io/kiosk/`.

Introductory game development library

To provide beginning programming students with a simple yet powerful framework for game development, I implemented JGame, a library for the Java programming language that enables students to focus on learning computer science and game development concepts instead of worrying about idiosyncratic implementation details. My framework is widely used by students at my high school; some student projects based on my library are public at `bit.ly/jgameprojects`. JGame projects are cross-platform and work equally well as desktop applications or web applets. JGame is open-source and available at `wchargin.github.io/JGame`.

Computer languages and systems

Java 6, 7 and Eclipse: Expert

Python 2, 3: Advanced

HTML/CSS: Advanced

C: Proficient

TeX and LaTeX: Comfortable

Vim: Love it

Office (MS, Open, Google): Advanced

Blender 3D: Advanced

Various: Basic to proficient knowledge of Ruby, Bash, Git and GitHub, and others.

Academic honors

- National Merit Scholar
- National AP Scholar
- Valedictorian
- Inter-Departmental Award (first ever)
- Most Outstanding Math and Science Student
- Best Delegate (WEMUN 2011, Beijing)
- Model Diplomat (LCMMUNC 2013)

References

Arvind Shrihari

`arvindshrihari@outlook.com`

Mr. Shrihari is a Software Development Engineer at Microsoft; he also co-teaches the AP Computer Science course at my high school. He designed and supervised my independent study.

Eric Ettlin

`mrumrocks@gmail.com`

Mr. Ettlin teaches a variety of web design and computer science courses at my high school. His students use my JGame library for game development projects. His website is `www.mrumrocks.org`.

Stephanie Finander

`sfinande@seq.org`

Ms. Finander currently teaches AP Calculus BC and AP Physics C: Mechanics classes at my high school. I took both these courses as a junior and was a peer tutor for AP Calculus BC as a senior.